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RadioShack®
www.radioshack.com℠

Sound Level Meter

Owner's Manual
Please read before using this equipment.

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❒ Introduction

Your RadioShack Sound Level Meter is an extremely versatile device for measuring sound intensity in just about any acoustic environment — loud or soft; high-pitched, low-pitched, or broad-band; intermittent or continuous. You can use it to measure noise levels in factories, schools, offices, and airports, or to check acoustics of studios, auditoriums, and home theater installations.

Your meter features a large, easy-to-read indicator for taking quick measurements. The meter uses a 9V battery (not supplied) which allows you to use it anywhere.

The meter's other features include:

Seven Sound-level Ranges — allow measurements form 50–126 dB (referenced to 0.0002 µbar).

A And C Weightings — lets you check compliance with safety regulations and make an acoustic analysis.

Slow And Fast Response Settings — let you check peak and average noise levels.

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Built-in Battery Condition Indicator — lets you check the battery condition.

Phono-type Output Jack — for connection to home theater or test equipment.

Threaded Insert — lets you attach the meter to a camera tripod for increased accuracy.

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❒ Specifications

Range:

Switch Setting	Range of Measurement
60 dB	50–66 dB
70 dB	60–76 dB
80 dB	70–86 dB
90 dB	80–96 dB
100 dB	90–106 dB
110 dB	100–116 dB
120 dB	110–126 dB

Accuracy ..... ± 2 dB @ 114 dB

Standard ..... 0 dB = 0.0002 µbar

Weighting ..... A and C

Response ..... Fast and Slow

Signal Output ..... 1.0V (peak) minimum into open circuit, with full-scale meter, deflection at 1 kHz

Load Impedance .....10k Ohm minimum

Distortion ..... Less than 2% at 1 kHz, 0.5V

Microphone ..... Electret condenser omnidirectional becoming slightly directional with increase in frequency

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Battery ..... One 9V

Battery Check ..... Tests “good” from 7.0 to 10.5V

Expected Battery Life ..... 110 working hours (alkaline battery)

Size (HWD) ..... $^{5}/_{16} \times 2\,^{7}/_{16} \times 1\,^{3}/_{4}$ Inches ($160 \times 62 \times 44$ mm)

Weight ..... 6.6 oz (185 g)

Specifications are typical; individual units might vary. Specifications are subject to change and improvement without notice.

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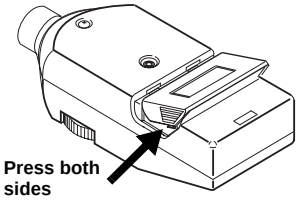
❒ Installing a Battery

Your meter requires one 9V battery (not supplied) for power. For the best performance and longest life, we recommend a RadioShack alkaline battery.

Caution: Use only a fresh battery of the required size and recommended type.

Follow these steps to install the battery.

1. Press both sides of the battery compartment cover and lift it.



   Note: The battery compartment cover cannot be removed.

2. Place the battery in the compartment as indicated by the polarity symbols (+ and –) marked inside.

3. Close the cover.

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To test the battery, set **RANGE** to **BATT**. If the meter shows a reading in the red **BATT TEST** region, the battery is still good. Replace the batteries when the reading is in any other region or the meter stops operating.

Warning: Dispose of old batteries promptly and properly. Do not burn or bury them.

Caution: If you do not plan to use the meter for a week or more, remove the batteries. Batteries can leak chemicals that can destroy electronic parts.

Note: Leave **RANGE** in the **OFF** position when the meter is not in use to conserve battery power.

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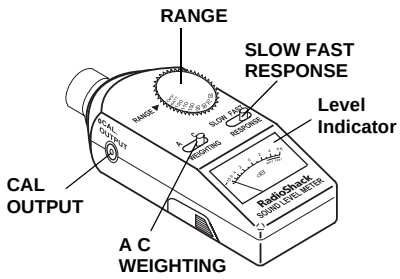
❒ Controls



RANGE

The **RANGE** selector lets you select one of seven sound level ranges, each spanning 16 dB. The **RANGE** numbers refer to the center points of the seven ranges. The needle level indicator shows the actual sound level as a displacement from the center point. For example, if **RANGE** is set to **80** and the meter scale reads **–3**, the actual sound level is 77 dB (80–3). If the meter scale reads **0** (same as the value where **RANGE** is set), the actual sound level is 80 dB (80+0).

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OUTPUT

The phono-type **OUTPUT** jack lets you connect the meter to recording or other measurement equipment. For example, you might use an audio patch cord to connect the meter to the AUX or high-level input of a recorder.

Note: The meter response will not be flat, due to the A- and C-weighting networks.

Set **RANGE** so the maximum needle deflection is never greater than +4, to prevent the built-in amplifier from clipping. Use A-weighting for voice recordings, or C-weighting for full-range musical material. The **OUTPUT** jack can also be connected to high-impedance headphones, or an oscilloscope, a frequency analyzer, or other test equipment.

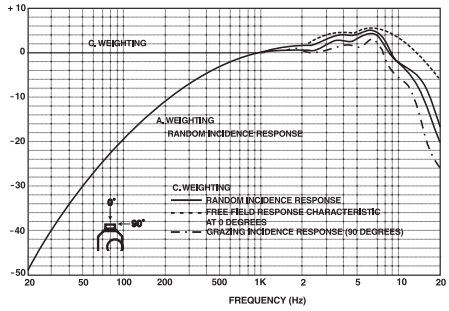
RESPONSE

The **RESPONSE** selector has two settings: **FAST** and **SLOW**. In the **FAST** position, the meter reacts quickly to changes in the sound level, showing you the peak sound levels present in the environment. In the **SLOW** position, the meter is damped and indicates an average-value sound level.

The effect of brief sound peaks is minimized in the **SLOW** position.

WEIGHTING

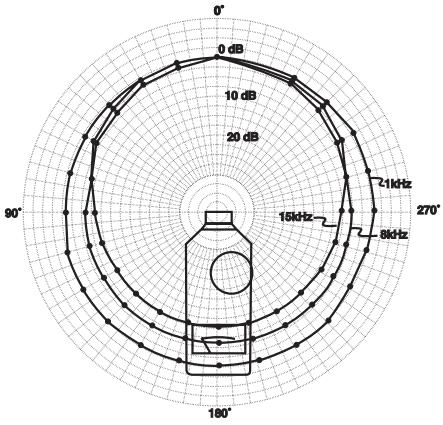
Set **WEIGHTING** to weight the sound measurement for a particular frequency range. When set to **A**, the meter primarily measures frequencies in the 500–10,000 Hz range, which is the area of greatest sensitivity to the human ear. When set to **C**, the meter measures uniformly over the frequency range from 32–10,000 Hz, giving an indication of the overall sound level.



Typical A- and C-weighted response curves (A-weighted with random-incidence)

MICROPHONE

The meter's built-in microphone works best when you point it directly at a sound source.



TRIPOD ADAPTER

You can mount the meter on a camera tripod (standard 1/4–20 thread) to eliminate hand noise and minimize the effects of sound reflected from your body. This makes it easy to use the meter with auxiliary recording or test equipment.

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CAL (CALIBRATION)

Your meter has been accurately calibrated and normally will not require further adjustment. If adjustment is necessary, take the sound meter to an audio professional who can calibrate the meter by connecting special equipment, such as a sound generator, to the **CAL** jack.

MEASUREMENTS

Important:

- Do not hold the meter directly between you and the sound source, as this might produce an error of several decibels in the frequency range above 100 Hz. Position the meter so an imaginary line between you and the meter is perpendicular to a line between the meter and the sound source.

- Handle the meter carefully. The microphone and meter movement are fragile and might be damaged if the instrument is dropped. Do not operate the meter at a range setting that causes pegging of the needle. This could damage the movement.

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Follow these steps to select the desired response, weighting, and range.

1. Set **RESPONSE** to **FAST** if the sound source you want to measure consists of short bursts or if you want to measure only peak values. Or, set **RESPONSE** to **SLOW** if you want to measure average sound levels.

2. Set **WEIGHTING** to **A** if you want to measure noise level or **C** if you want to measure sound levels of musical material.

3. Set **RANGE** to the highest setting (**120 dB**) then adjust it downward until there is significant deflection of the needle. For the greatest accuracy, always use the lower of any two possible settings.

   For example, if **RANGE** is set to **80 dB** and the meter reads **–5**, reset **RANGE** to **70 dB** so the meter reads **+3**, for an actual sound level of 73 dB.

   Important: For meaningful readings, any particular sound to be measured must be at least 10 dB louder than the background noise level.

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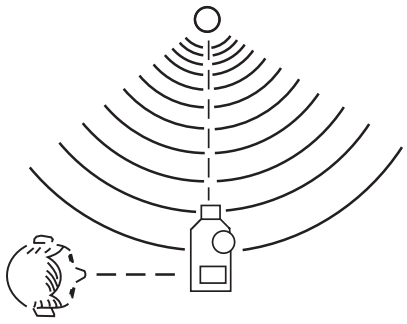
While taking measurements, minimize the effect of your body's presence. When the sound is coming mainly from one direction, the level reading might be significantly affected by reflections from your body.

For the most accurate readings and the best polar response, point the meter's microphone toward the sound source when possible.



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CHECKING NOISE LEVELS

This chart, gathered from Federal, State, and local agencies, shows standards for acceptable noise levels.

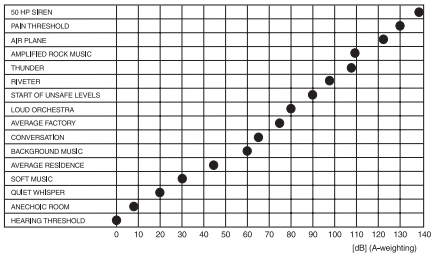
Sound Level (dB) (A-weighting, SLOW response)	Maximum Duration per Day (hours)
90	8
92	6
95	4
97	3
100	2
102	1 1/2
105	1
110	1/2
115	1/2 or less

Permissible noise exposures. Extracted from U.S. Department of Labor Noise Regulations.

Noise is inevitable in almost any environment. Depending on the level and duration, noise can be a minor irritant, a definite disturbance, or even a threat to your hearing.

To use your meter to check noise levels, set **WEIGHTING** to **A** and **RESPONSE** to **SLOW**. Take measurements at several points in the test area, with the meter positioned properly.

Average dB levels of some common activities.



CHECKING ROOM ACOUSTICS

The size, shape, and furnishings of a room can have a tremendous effect on a home theater system's performance. A "hard" room with bare surfaces tends to exaggerate treble response, sometimes giving the music a strident quality. A "soft" room with curtains, overstuffed furniture, carpet, and so on, might reduce high-frequency response. This may result a dominant bass sound.

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Depending on the speaker placement, standing waves might also develop in the room, giving your system a “peaky”, eccentric response.

To determine a room’s acoustics, analyze the acoustics with your meter and a suitable test recording. The test recording should produce pure tones, one at a time, at intervals spanning the audio spectrum. Make a graph or table showing the sound levels generated by the individual tones. This gives you a clear idea of the frequency response of your “total system”—home theater equipment and room included.

To smooth out the response, adjust the tone controls and vary the speaker placement. To approximate the ideal, “flat response”, you could add a frequency equalizer to your home theater system. Your local RadioShack store carries frequency equalizers that let you boost or cut response in different ranges, as indicated by your frequency response analysis. Properly equalized, your system can sound like one costing considerably more!

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Note: When checking the frequency response, if **WEIGHTING** is set to **C**, the meter's frequency response is flat from 32 –10,000 Hz (± 3 dB). Above 10 kHz, the frequency response of the meter drops off rapidly. Be sure to consider this when you use a test recording that includes tones at the extreme high end of the audio spectrum.

Limited Ninety-Day Warranty

This product is warranted by RadioShack against manufacturing defects in material and workmanship under normal use for ninety (90) days from the date of purchase from RadioShack company-owned stores and authorized RadioShack franchisees and dealers. EXCEPT AS PROVIDED HEREIN, RadioShack MAKES NO EXPRESS WARRANTIES AND ANY IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THE WRITTEN LIMITED WARRANTIES CONTAINED HEREIN. EXCEPT AS PROVIDED HEREIN, RadioShack SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO CUSTOMER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS OR DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY USE OR PERFORMANCE OF THE PRODUCT OR ARISING OUT OF ANY BREACH OF THIS WARRANTY, INCLUDING, BUT NOT LIMITED TO, ANY DAMAGES RESULTING FROM INCONVENIENCE, LOSS OF TIME, DATA, PROPERTY, REVENUE, OR PROFIT OR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, EVEN IF RadioShack HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

In the event of a product defect during the warranty period, take the product and the RadioShack sales receipt as proof of purchase date to any RadioShack store. RadioShack will, at its option, unless otherwise provided by law: (a) correct the defect by product repair without charge for parts and labor; (b) replace the product with one of the same or similar design; or (c) refund the purchase price. All replaced parts and products, and products on which a refund is made, become the property of RadioShack. New or reconditioned parts and products may be used in the performance of warranty service. Repaired or replaced parts and products are warranted for the remainder of the original warranty period. You will be charged for repair or replacement of the product made after the expiration of the warranty period.

This warranty does not cover: (a) damage or failure caused by or attributable to acts of God, abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation or maintenance, alteration, lightning or other incidence of excess voltage or current; (b) any repairs other than those provided by a RadioShack Authorized Service Facility; (c) consumables such as fuses or batteries; (d) cosmetic damage; (e) transportation, shipping or insurance costs; or (f) costs of product removal, installation, set-up service adjustment or reinstallation.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

RadioShack Customer Relations, 200 Taylor Street, 6th Floor, Fort Worth, TX 76102

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